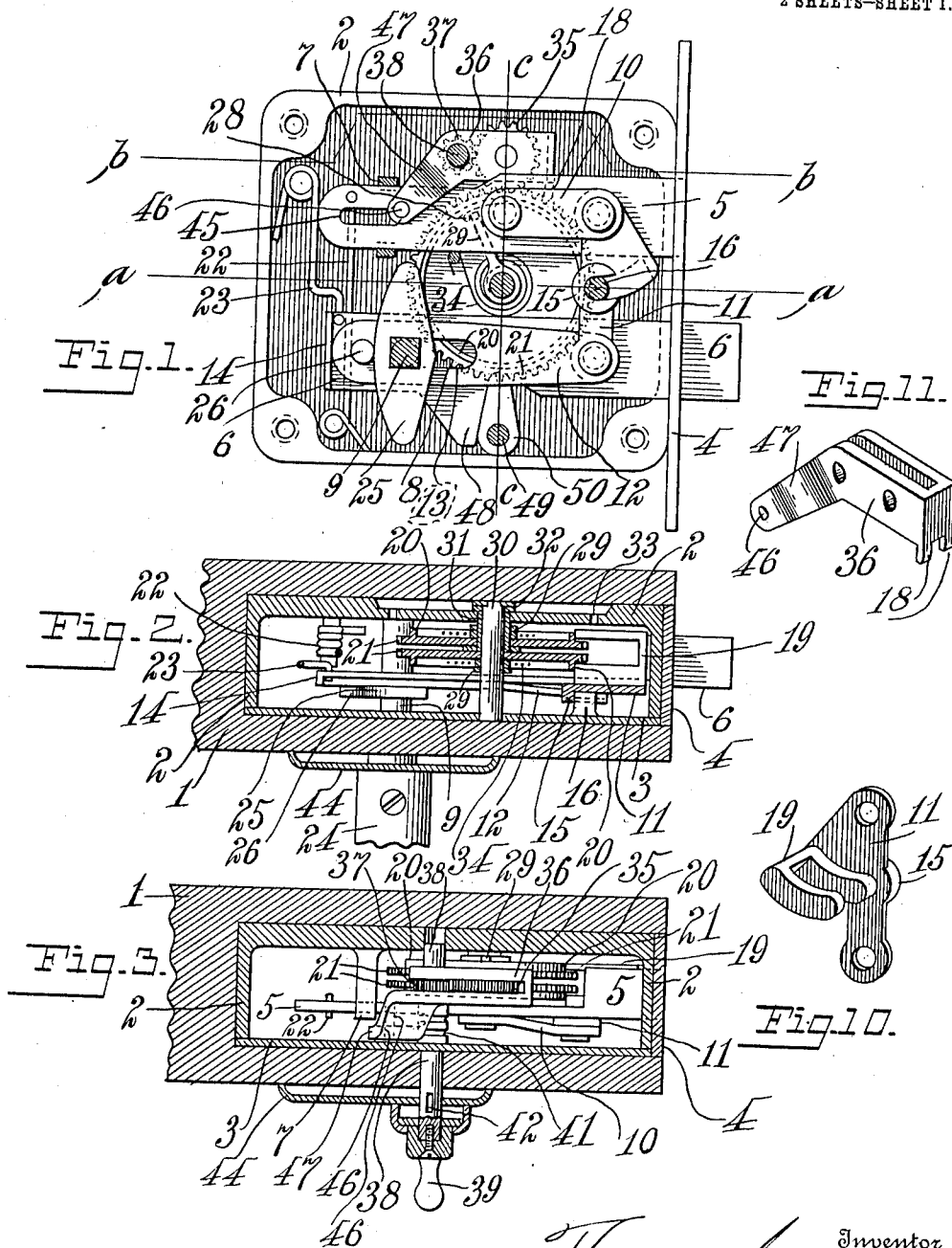


T. CARROLL.
KEYLESS LOCK.
APPLICATION FILED MAY 11, 1911.

1,066,465.

Patented July 8, 1913.
2 SHEETS—SHEET 1.



Witnesses
M. Siebler
H. A. Smith

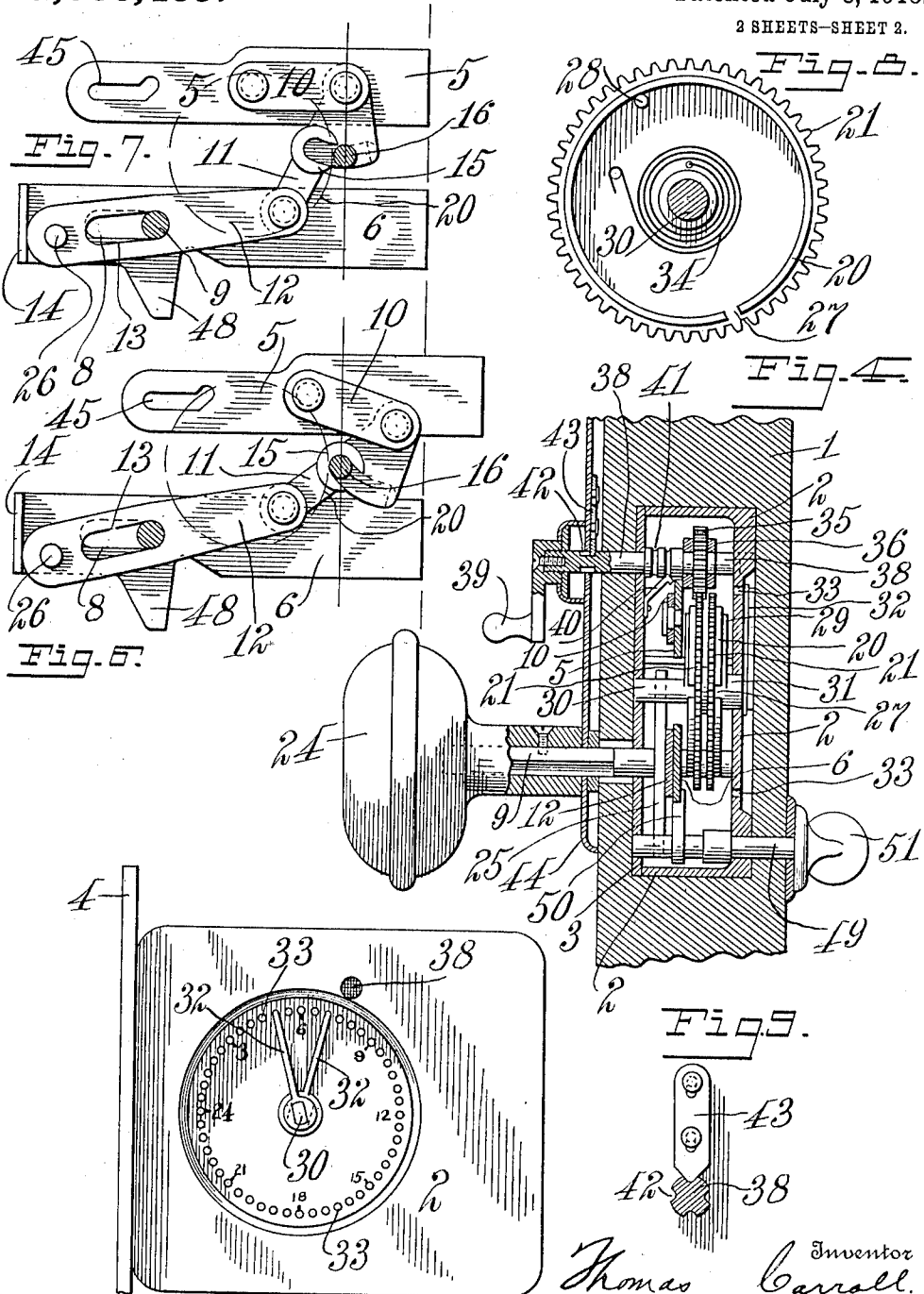
Thomas Carroll Inventor

By *R. M. Carty* his Attorney

1,066,465.

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2 SHEETS-SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS CARROLL, OF OAKWOOD, OHIO.

KEYLESS LOCK.

1,066,465.

Specification of Letters Patent.

Patented July 8, 1913.

Application filed May 11, 1911. Serial No. 626,543.

To all whom it may concern:

Be it known that I, THOMAS CARROLL, a citizen of the United States, residing at Oakwood, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Keyless Locks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in combination locks.

The object of the invention is to provide a lock which is proof against unlawful manipulation.

The invention provides lock mechanism which does not render the knob spindle fixed or immovable when the lock is in a securing position. The mechanism is thereby rendered free from liability to damage when attempts are made to throw the bolt to an unlocked position by turning the knob spindle. The turning of the knob spindle at such time allows the combination wheels to be turned to zero and reverses the bolts, throwing one bolt out of a locking position and the other into a locking position. The lock mechanism is thus safe-guarded from injury due to tampering, and the security of the lock is not affected.

Other objects and advantages of the invention will appear in the specification to follow, in connection with the accompanying drawings.

Referring briefly to the accompanying drawings, Figure 1 is a side elevation of my improved lock with the cover of the casing removed; Fig. 2 is a section on the line *a a* of Fig. 1; Fig. 3 is a section on the line *b b* of Fig. 1; Fig. 4 is a section on the line *c c* of Fig. 1; Fig. 5 is a side elevation of the lock showing the means for selecting the combination; Figs. 6 and 7 are views of the companion bolts and their actuating connections in different positions; Fig. 8 is a detail view of one of the wheels of the combination mechanism; Fig. 9 is a detail view of the holding means for the combination

mechanism; Fig. 10 is a detail perspective view of the lever which is instrumental in controlling the movements of the bolts as shown in Figs. 6 and 7; and Fig. 11 is a detail view of the gear-shifting frame.

Throughout the specification and drawings, similar reference characters indicate corresponding parts.

Referring more particularly to the drawings, 1 represents a portion of a door into which is set the housing or casing 2 of the lock, the same being provided with a cover plate 3 and a face plate 4 with bolt apertures. Reciprocably arranged in said face plate and housing are main and auxiliary lock bolts 6 and 5 respectively. Either of these bolts serves as the locking medium when thrown out. The inner end of bolt 5 is guided by projections 7, and the similar end of bolt 6 is provided with a slot 8 which receives the knob spindle 9, and is thereby supported. Pivotally attached at one end to the bolt 5 is a link 10, the other end of which is pivotally attached to the upper end of a lever 11. The lower extended end of said lever is pivotally attached to one end of a longitudinally reciprocable member 12 which lies parallel with the bolt 6, and is provided with a slot 13 similar to that in the main bolt 6 and which receives the knob spindle 9, which also passes through the slot in said main bolt. The opposite end of said member 12 is adapted to engage a lateral projection 14 on the extreme inner end of said bolt 6, as will hereinafter more fully appear.

On one side of the intermediate portion of the lever 11 is an apertured boss 15 which is adapted to receive a pin 16 extending from the cover plate 3. The other side of the intermediate portion of said lever is provided with an elongated bifurcated lug 19 which is adapted to engage flanges 20 on gears 21, see Figs. 2, 8 and 10. The pin 16, when in the apertured boss 15, and the lug 19 when engaging the flanges 20, form an intermediate fulcrum for the lever 11 when one or the other bolt 6 or 5 is being shot. This pin 16 at such time maintains the fulcrum upon which the lever 11 turns. The bolt 5 is controlled by a spring 22 which normally holds it in a retracted position,

while the bolt 6 is controlled by a spring 23 which normally holds it in an extended position.

The knob spindle 9 extends through the housing 2 and the outer side of the door 1, and is provided with a knob 24 by means of which it may be turned. Penetrated by the said knob spindle 9 and lying on the interior of the housing 2 adjacent to the member 12, is an elongated cam 25 in engagement with a pin 26 on the reciprocable member 12. When the knob spindle 9 is turned, the cam 25 will actuate the sliding member 12, thereby drawing the main bolt 6 inwardly against the tension of the spring 23 and through the engagement of the inner end of the said member 12 with the bolt projection 14, see Fig. 1. When the said bolt 6 is thus drawn inwardly, the bolt 5 is thrown or cast outwardly. At this time it will be understood the lever 11 moves on its intermediate fulcrum. The bolt 5, it will be borne in mind, is controlled by the cam 25 through the link 10, lever 11 and the sliding member 12. When said cam is acting to move the main bolt 6 inwardly, the spring 22 has no effect on the said bolt 5. When the parts are in their normal position, which is shown in Fig. 1, the bolt 6 is extended to the locking position. When the knob spindle 9 is rocked, bolt 5 will become the locking bolt, bolt 6 being retracted. The construction and arrangement are such that, when the lever 11 is moved on its intermediate fulcrum, either one or both of the bolts 5 and 6 will be in a locking position as hereinbefore stated and as will be seen from Figs 1 and 6; therefore the turning of the knob will not effect an unlocking. This is the condition as long as the combination is set. The main bolt 6 may be retracted without extending the auxiliary bolt. To withdraw said bolt 6 without extending bolt 5, and thereby unlock the door, the following devices are provided, which relieve the lever 11 of the intermediate fulcrum by moving said lever inwardly, as in Fig. 7: As before stated, the bifurcated lug 19 of said lever is adapted to engage the flanges 20 of the combination gears 21 when it is subjected to its intermediate fulcrum. The flanges each are provided with a recess 27 adapted to receive the arms of the said bifurcated lug 19, see Fig. 8. When said combination gears are rotated to a point where the recesses 27 become in alinement with said lug 19, and the knob spindle 9 is rocked, the spring 22 will hold the bolt 5 in a retracted position, while the main bolt 6 may be drawn inwardly. The lever 11 at such time moves on its upper fulcrum, owing to the arms of the lug 19 entering the recesses 27 in the combination gears. When the knob spindle 9 is returned to a normal position, the springs 22 and 23

will throw the bolts in the opposite direction. The combination gears 21 are constructed and actuated or set as follows: Each is provided with a pin 28 adapted to engage a respective movable stop 29. These stops are independently movable and are mounted on an arbor 30 partially inclosed by a sleeve 31. The arbor 30 and sleeve 31 extend to the outside of the casing 2 where they are provided with resilient arms 32, see Figs. 2, 4 and 5. The outer ends of said arms 32 are adapted to enter orifices 33 in the casing. The combination of numbers indicating the movement of the combination wheels 21 necessary to bring them to a position to permit the lock to be unlocked, is obtained by setting the arms 32 in the desired recesses 33. When the ends of said arms 32 rest in the selected orifices, their respective stops 29 are placed in a set position, and the relative numbers of the selected stops represent the number of spaces it is necessary to rotate the respective combination gears 21 to bring the recesses 27 in alinement with the lug 19. The said gears 21 are held in a normal position with the pins 28 in engagement with the stops 29, by spiral springs 34 which are also adapted to rotate the gears to normal after they have been set. The gears 21 are rotated or set as follows: Mounted above said gears 21, and adapted to mesh with either, is a pinion 35 pivotally supported in a slidable frame 36, see Figs. 1, 3 and 11. The said pinion 35 is in mesh with a smaller pinion 37 rigidly mounted on an arbor 38. The said arbor 38 is slidably mounted in the lock housing 2 and extends to the exterior of the door, where it is provided with a crank 39. The ratio of the gears 21 and pinions 35 and 37 is such, that one fourth of a revolution of the crank 39 rotates either of the gears 21 to the extent of one point or unit in the numerical combination. The frame 36 is carried by the arbor 38, and said arbor is capable of a horizontal movement in addition to its pivotal movement. The horizontal movement is imparted thereto by shifting the crank 39, which also shifts the frame 36, thereby selecting the operative relation between the pinion 35 and either of the gears 21. The said arbor 38 is held in either of its shifted positions by a spring 40 engaging either of two annular recesses 41 therein, see Fig. 4. To permit the operator to ascertain when the crank 39 has advanced one of the gears one point or unit, the arbor 38 is provided in the present case with four recesses 42 adapted to receive the lower end of a gravity bolt or plunger 43, see Fig. 9. The said bolt or plunger 43 is mounted on the inclosed face of an escutcheon or plate 44 on the outside of the door. The slight resistance offered thereby to the rotation of

arbor 38, as it engages the recesses 42, indicates to the operator that the crank has made one fourth of a revolution, and that the gear 21, which is being set, has advanced one point.

The operator or any authorized person is supplied with the numbers necessary to manipulate the lock to set it. There are two of these numbers corresponding to the two combination gears 21, and they are selected by inserting the arms 32 in the orifices 33, Fig. 5, as hereinbefore stated. When it is desired to manipulate or set the combination, the crank 39 is given the necessary quarter turn which corresponds to one point in the combination. The said crank is then shifted to place the pinion 35 in mesh with the other gear 21, and is then rotated the necessary extent corresponding to the second point in the combination. When the pinion 35 is shifted out of mesh with one of the gears 21, the other gear is held in a set position by one of the teeth 18 on the frame 36, see Figs. 1 and 11. When both of the gears 21 are set, as when the combination is set, the recesses 27 will be in alinement with the lug 19 of the lever 11. This allows the main bolt 6 to be retracted without disturbing the auxiliary bolt 5, when the knob spindle 9 is turned. As long as the recesses 27 are in alinement with the lug 19, the lock may be actuated by the knob 24 to open the door. To lock the door, one of the gears 21 is rotated to bring its respective flange 20 in a position to engage the lug 19, thereby placing the lock out of combination. A rotation of the knob spindle 9 will then reciprocate or throw the bolt 5, the lever 11 moving on its intermediate fulcrum. The said bolt 5 is provided with a cam slot 45, which receives a pin 46 mounted on an arm 47 which extends from the frame 36, Fig. 11. When said bolt 5 is thus thrown out, the frame 36 will be rocked upon the arbor 38, thereby elevating the pinion 35 and the teeth 18, and releasing the gears 21. When said gears are released, they are returned to normal position by the springs 34. It will be understood that the frame 36 is rocked each time the auxiliary bolt 5 is actuated, therefore, when the lock is in a securing condition and the combination wheels 21 are not set, the said frame 36 will be elevated every time the knob spindle is actuated. The result is that if an unauthorized person should improperly set the said combination wheels 21, and then actuate the knob spindle, the said wheels in each case will be returned to zero. This precludes the possibility of any one systematically working the combination.

To allow an operator to retract the bolt 6 from a position of the operator on the inside of the door, and without working the

combination, the said bolt is provided with a lateral extension 48 which is engaged by an arm 50 on an arbor 49, Fig. 4. The arbor 49 extends through the lock housing 2 to the inner side of the door, where it is provided with a finger piece 51 by means of which it may be turned. When said arbor is actuated, the lower or main bolt 6 only will be actuated, other portions of the lock being undisturbed, as the projection 14 will recede from the inner end of the slidable connecting member 12.

Owing to the fact that the knob may be rotated at all times, its rotation cannot be taken as an indication when the proper combination has been set; and as the combination wheels are returned to normal position at each action of the knob when in a locked position, the lock cannot be "picked" or the combination thereof be secured through any systematic manipulation of the crank.

Without limiting myself to the precise combination and arrangement of parts shown and described, which may be varied within the scope of the claims, I claim:

1. In a keyless lock, the combination with a suitable casing, of parallel bolts slidably mounted therein, suitable connections between said bolts, and means adapted to cooperate with said connections whereby said bolts may be simultaneously thrown in opposite directions without disturbing the condition of the lock.

2. In a keyless lock, the combination with a casing, of parallel bolts mounted therein, connections between said bolts, and means adapted to furnish a fulcrum for said connections at a point between the bolts which is instrumental in enabling the positions of said bolts to be simultaneously reversed.

3. In a keyless lock, the combination with a casing, of parallel bolts, pivotal connections between said bolts, whereby said bolts may be simultaneously retracted, or one retracted and the other extended, means cooperating with said connections and forming an intermediate fulcrum therefor when said bolts are concurrently moved to retracted and extended positions, and actuating means engaging one of said bolts to impart either of such movements.

4. In a keyless lock, the combination with a housing, of upper and lower bolts slidably mounted in said housing, a lever connecting said bolts, means adapted to form a fulcrum for said lever, whereby the bolts may be shot in opposite directions, and means acting on one of said bolts to impart such movement.

5. In a keyless lock, the combination with a housing, of upper and lower bolts slidably mounted in said housing, means comprising a pivotal member connecting said bolts, combination wheels, and means cooperating with said combination wheels when they are not

set, to form a fulcrum upon which the pivotal member connecting the two bolts, turns when one of said bolts is actuated, and whereby said bolts are thrown in opposite directions.

6. In a keyless lock, the combination with a housing, of upper and lower bolts, a lever connection between said bolts, combination wheels, means adapted to cooperate with said combination wheels to form an intermediate fulcrum for said lever connection to turn upon in throwing said bolts in opposite directions, said wheels also having recesses, means controlling said wheels relatively to the movement of said bolts, and means for actuating one of said bolts alone or both of them concurrently according to the positions of said wheels.

7. In a keyless lock, the combination with a housing, of an upper and lower bolt slidably mounted in said housing, a lever connecting said bolts, means adapted to provide an intermediate fulcrum for said lever when the lock is in a locked condition, a plurality of recessed members cooperating with said means in providing said fulcrum, means for setting said members concurrently, and means for actuating one, or both bolts simultaneously according to the position of said recessed members.

8. In a keyless lock, the combination with a casing, of an upper and lower bolt slidably mounted in said casing, a lever forming a connection between said bolts, a plurality of recessed gear members, means cooperating with said gear members in forming an intermediate fulcrum for said lever at predetermined times, a shiftable pinion adapted to be moved into operative relation with either of said gear members, and means for actuating one or both of said bolts relatively to the position of said gear members.

9. In a keyless lock, the combination with a housing, of an upper and lower bolt slidably mounted in said housing, a lever connecting said bolts, means providing an intermediate fulcrum for said lever, shiftable members operatively related to said fulcrum, setting means controlling the shiftable position of said shiftable members, and means acting primarily upon one of said bolts and adapted to actuate one or both concurrently according to the position of said shiftable members.

10. In a keyless lock, the combination with a casing, of combination members having peripheral recesses, upper and lower bolts slidably mounted in said casing, a lever connecting said bolts, a fulcrum-forming member cooperating with said combination members in providing a fulcrum for said lever to turn upon, and whereby said bolts may be moved concurrently in opposite directions, means controlling said com-

bination members and adapted to move them out of cooperative relation with said fulcrum-forming member, and whereby one of said bolts may be moved independently of the other, and means acting upon one of said bolts to impart either of said movements.

11. In a device of the type specified, a housing, a plurality of bolts mounted in said housing, a lever connecting said bolts, a plurality of recessed gear members in operative relation with said lever and adapted to form a fulcrum therefor when said gear members are in certain of their positions, stop members on said gear members, setting arms in engagement with said stop members and controlling the normal position of said gear members, resilient means for holding and returning said gear members to a normal position, a shiftable pinion in operative relation with both of said gears, means for actuating said pinion, and means for actuating one or both of said bolts.

12. In a keyless lock, the combination with a housing, of a bolt mounted therein, means for actuating said bolt, a recessed member in operative relation with said bolt and the position of which controls the movement of said bolt, selective means for selecting the normal position of said recessed member, means for moving said recessed members to said normal position, and means for actuating said recessed member after its normal position is selected.

13. In a device of the type specified, a housing, a bolt mounted in said housing, means for actuating said bolt, a recessed gear member in operative relation with said bolt, a stop member on said gear member, an adjustable arm in operative relation with said stop, a resilient member controlling said gear member, and means for setting said gear member.

14. In a device of the type specified, a housing, a bolt mounted in said housing, means for actuating said bolt, a plurality of recessed gear members in operative relation with said bolt, stop members on said gear members, adjustable arms in operative relation with said stops, resilient members controlling said gear members, a shiftable pinion in operative relation with said gear members, and means for actuating said pinion to set said gear members.

15. In a device of the type specified, a housing, upper and lower bolts mounted in said housing, connections between said bolts, actuating means for normally and alternately moving said bolts to locking positions, means controlling said connections, whereby both bolts may be moved to unlocking position by said actuating means, setting means for said controlling means, and means actuated by said setting means, and

one of said bolts for holding said controlling means in a set position.

16. In a device of the type specified, a housing, upper and lower bolts mounted in said housing, a lever connecting said bolts, means providing an intermediate fulcrum for said lever, a plurality of recessed gear members in operative relation with said pivot, means controlling the normal position of said gear members, a shiftable pinion in operative relation with said gear members and adapted to set the same, shiftable means adapted to actuate said pinion and to lock said gear members in a set position, and means for actuating one or both of said bolts.

17. In a device of the type specified, a housing, upper and lower bolts mounted in said housing, a lever connecting said bolts, means providing an intermediate fulcrum for said lever, a plurality of recessed gear members in operative relation with said intermediate fulcrum, stop members on said gear members, adjustable arms in engagement with said stops and controlling the normal position of said gear members, resilient means for holding and returning said gear members to a normal position, a shiftable pinion in operative relation with said gear members, a frame adapted to shift said pinion and to lock said gear members in a set position, and means for actuating one or both of said bolts.

18. In a device of the type specified, the combination with a casing, of bolts slidably mounted in said casing, a lever having an intermediate fulcrum, said lever being connected to one of said bolts by a swinging pivot, a slidable member to which said lever is connected by a swinging pivot, and a knob spindle penetrating suitable openings in one of said bolts and said slidable member, and whereby one or the other of said bolts may be thrown.

19. In a device of the type specified, the combination with a casing and a knob spindle, of companion bolts slidably mounted in said casing, one of which is penetrated by said knob spindle, pivotal and slidable members between the other of said bolts and said knob spindle, and means providing an intermediate fulcrum for said pivotal member when throwing one or the other of said bolts from the knob spindle.

20. In a device of the type specified, the combination with a casing, of upper and lower bolts slidably mounted in said casing, the lower bolt having an elongated aperture, a reciprocable member having an elongated aperture and adapted to engage said lower bolt, an actuating knob spindle penetrating the apertures in said lower bolt and reciprocable member, means actuated by said spindle through which said reciprocable

member and lower bolt are actuated, a lever connected to the upper bolt and said reciprocable member, and means arranged to engage said lever at an intermediate point to form a fulcrum upon which said lever turns in throwing one or the other bolts through the engagement of said spindle with the reciprocable member.

21. In a device of the type specified, the combination with a casing, of upper and lower bolts slidably mounted in said casing, the lower bolt having an elongated aperture, a reciprocable member having an elongated aperture and adapted to engage said lower bolt, an actuating knob spindle penetrating the apertures in said lower bolt and reciprocable member, means actuated by said spindle through which said reciprocable member and lower bolt are actuated, a lever connected to the upper bolt and said reciprocable member, and means arranged to engage said lever at an intermediate point to form a fulcrum upon which said lever turns in throwing one or the other bolts through the engagement of the spindle with the reciprocable member, and means engaging said lower bolt and adapted to actuate the same independently of the spindle.

22. In a lock of the type specified, the combination with a main and an auxiliary bolt, and a knob spindle, of a cam actuated by said knob spindle, a reciprocable member actuated by said cam and actuating said main bolt in one direction, levers connecting the auxiliary bolt with said reciprocable member, means providing a changeable intermediate fulcrum for one of said levers when the bolts are moving in opposite directions, and elastic means adapted to extend the auxiliary bolt when the main bolt is retracting.

23. In a lock of the type specified, the combination with main and auxiliary bolts, and a knob spindle, of a cam actuated by said knob spindle, a reciprocable member actuated by said cam and adapted to retract the main bolt, levers connecting the auxiliary bolt with said reciprocable member, one of said levers being provided with a changeable intermediate fulcrum, and means for extending the main bolt when free from the influence of the cam, and whereby the auxiliary bolt is retracted.

24. In a device of the type specified, a housing, upper and lower bolts mounted in said housing, a cam, a lever permanently pivoted to the upper bolt, a pin providing an intermediate fulcrum for said lever, a connecting member connecting said lever and said cam, said connecting member also being in operative relation with the lower bolt, recessed gear members in operative relation with the intermediate pivot of said

lever, stop members on said gear members,
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bers controlling said gear members, a shift-
5 able pinion in operative relation with said
gear members, and means adapted to actu-
ate said pinion.

In testimony whereof I affix my signa-
ture, in presence of two witnesses.

THOMAS CARROLL.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
